

REMARKS/ARGUMENTS¹

Upon entry of this Amendment, Claims 1, 5, 13, 14, 23, 27, 29-31, 37, 42-47, 51-59 and 63-66 will be pending in the present application.

Claims 1, 14, 23, 31, 37, 42, 53, 54, 65 and 66 have been amended.

Claims 2-4, 6-12, 15-22, 24-26, 28, 32-36, 38-41, 48-50 and 60-62 have been canceled without prejudice. Of those Claims, Claims 6-12, 15-22, 28, 32-36 and 38-41 were previously withdrawn in response to the restriction requirement and are now canceled without prejudice in response to the Examiner's request on page 13 of the March 3, 2006 Final Office Action. Applicant respectfully reserve the right to pursue the claims of comparable scope in one or more continuing applications at a later time.

Applicant also respectfully notes that all of the independent claims (Claims 1, 23, 42 and 54) have been amended to require the prestress compression to be at 4,000 psi or greater. The claims involving the minimum required prestress compression less than 4,000 psi (i.e., Claims 2-4, 24-26, 48-50 and 60-62) have been canceled without prejudice. Applicant respectfully reserves the right to pursue the claims having the scopes comparable to those canceled claims in one or more continuing applications at a later time.

It is respectfully submitted that no new matter has been added by this Amendment. Favorable consideration and allowance of all of the pending claims in view of the foregoing amendments and the following remarks are respectfully requested.

¹ All paragraph numbers of the specification cited in this Amendment correspond to the paragraph numbers appearing in U.S. Patent Application Publication No. US 2005/0016093 A1 of the present application.

Applicant respectfully responds to the Final Office Action dated March 3, 2006 as follows:

Information Disclosure Statement:

In the March 3, 2006 Final Office Action, the Examiner continues to take the position that the Information Disclosure Statement filed on October 19, 2005 failed to fully comply with the provisions of 37 C.F.R. §§ 1.97, 1.98 and MPEP 609, because the publication date for one of the submitted documents entitled "Mission Area: Structural Blast Mitigation" ("the Mission Area Document") was not provided. The Examiner further states that the Mission Area Document has been placed in the application file, but the information referred to therein has not been considered as to the merits.

In response, Applicant has no additional comment, but reiterates its earlier explanation as to why the Mission Area Document has been submitted in connection with its duty of disclosure. It is respectfully submitted that the Applicant authored the Mission Area Document prior to the date of invention of the subject matter disclosed in the present application and submitted this document to a governmental entity. However, Applicant is not aware of any publication of this document by such governmental entity or any others (other than the disclosure by the U.S. Patent Office as explained below) so that it would constitute prior art as set forth under 35 U.S.C. §§ 102/103.

In this connection, it is noted that the same document was submitted by the Applicant to the U.S. Patent Office as one of the references cited in the Information Disclosure Statement for U.S. Patent Application Serial No. 10/076,971 ("the '971

Application”). The ‘971 Application was published by the U.S. Patent Office as U.S.

Patent Application Publication No. US 2003/0145534 A1 on August 7, 2003.

Accordingly, the Mission Area Document would have been available to the public through the U.S. Patent Office as of the publication date of the ‘971 Application, which was after the filing date of the present application. Applicant is not aware of any earlier date this document would have been made available to public. It is also noted that U.S. Patent No. 6,964,809 B2 issued from the ‘971 Application on November 15, 2005 cites the Mission Area Document in its References Cited section.

Thus, at the present time, Applicant has no reason to believe that the Mission Area Document indeed constitutes prior art as set forth in 35 U.S.C. §§ 102/103. Nevertheless, Applicant discloses this document to comply with its duty of disclosure in the event that such reference is indeed found to be a prior art publication.

Claim Objections:

In the March 3, 2006 Final Office Action, the Examiner objected to Claims 14, 31, 37, 53 and 66 for reciting “said tension members” when the respective claims from which they depend do not positively set forth a plurality of members. In response, Applicant respectfully submits that those Claims have been amended to reflect proper antecedent bases. Accordingly, it is respectfully requested that the Examiner’s objections to Claims 14, 31, 37, 53 and 66 be withdrawn and those Claims be allowed.

Claim Rejections - 35 U.S.C. § 103:

In the March 3, 2006 Final Office Action, the Examiner rejected Claims 1-5, 13, 14, 23-27, 29-31, 37 and 42-66 under 35 U.S.C. § 103(a) as being unpatentable over

U.S. Patent No. 4,324,037 to Grady, II ("the '037 Patent") in view of either U.S. Patent No. 3,292,316 to Zeinetz ("the '316 Patent") or U.S. Patent No. 4,450,656 to Lagendijk ("the '656 Patent") when considering either U.S. Patent No. 4,124,365 to Williams et al. ("the '365 Patent") or U.S. Patent No. 3,056,184 to Blaha ("the '184 Patent"), and further considering any of U.S. Patent No. 3,459,565 to Jones et al. ("the '565 Patent"), U.S. Patent No. 3,592,619 to Elmer et al. ("the '619 Patent"), and U.S. Patent No. 2,758,937 to Ford ("the '937 Patent"). Applicant respectfully traverses these prior art rejections for the following reasons.

Applicant respectfully submits that none of the above-mentioned references relied upon by the Examiner teaches or even suggests prestressing of a foam glass tile under the prestress compression of 4,000 psi or greater as required by all of the pending claims in the present application as amended by this Amendment. As the Examiner acknowledged in the Office Action, the '037 Patent "does not present the tiles 82 as made of a foamed glass." (March 3, 2006 Final Office Action at 3). To support the claim rejection, the Examiner combines the teachings of the '316 Patent or the '656 Patent with that of the '037 Patent and takes the position that the '316 and the '656 Patents "teach utilization of foamed glass tiles or blocks within a tensioned structural arrangement." (Id.). However, the applicant respectfully submits that neither the '316 Patent nor the '656 Patent teaches prestressing of a foamed glass material under any amount of prestress compression, let alone the prestress compression of 4,000 psi or greater.

To support his prior art rejection, the Examiner points to Fig. 11 and col. 4, lines 5-9 of the '316 Patent. However, nowhere in the '316 Patent, including the portions the

Examiner cited, is there any teaching or even suggestion of prestressing of a foam glass tile under any amount of prestress compression. In fact, col. 3, lines 73-74 of the '316 Patent describes what is shown in Fig. 11 merely as a "locking means for use in connection with a U-shaped or tubular seam 19e, 119e, 21e and 121e." Nowhere in the '316 Patent is there a suggestion that Fig. 11 shows prestressing of a foam glass tile under any amount of prestress compression. Furthermore, while the '316 Patent suggests panels made of foamed glass or the like ('316 Patent, col. 4, lines 7-8), it then further suggests that "a load sustaining layer [be] made of concrete" ('316 Patent, col. 4, line 14), thus teaching away from production of a load sustaining layer made of prestressed foam glass materials. Based on the foregoing, it is respectfully submitted that the '316 Patent does not teach or suggest prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater as required by the pending claims as amended herein, and in fact teaches away from prestressing of a foam glass tile.

In the '656 Patent, the Examiner points to Figs. 1, 2 and 6, as well as col. 3, lines 30-60 and col. 4, lines 34-37 to support his position with respect to the prior art rejection. However, nowhere in the '656 Patent, including the portions the Examiner cited, is there any teaching or even suggestion of prestressing of a foam glass tile under any amount of prestress compression. The '656 Patent suggests, at best, the use of foam glass as the roof covering materials. ('656 Patent, col. 4, lines 32-44). The Examiner points to the inner bracing cables 33, 34, the cross tie cables 36, the lower running cable 45, etc. that form the suspended roof structure in Figs. 1 and 2 of the '656 Patent as

showing "tension members," but nowhere in the '656 Patent is there any teaching or suggestion that those tension members contribute to prestressing of foam glass materials used as the roof covering materials. (See generally col. 6, line 42 - col. 8, line 14). In fact, Fig. 6 and col. 9, lines 49-55 of the '656 Patent teach reinforcing of foam glass elements 65 by securing them to the glass-fibre mats 60, 61 by adhesive 66, thus providing an alternative means for reinforcing foam glass materials and teaching away from prestressing as means for reinforcing foam glass materials. Based on the foregoing, it is respectfully submitted that the '656 Patent does not teach or suggest prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater as required by the pending claims as amended herein, and in fact teaches away from prestressing of a foam glass tile.

It is further respectfully submitted that neither the '365 Patent, nor the '184 Patent, nor the '565 Patent, nor the '619 Patent, nor the '937 Patent teaches or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater. In the March 3, 2006 Final Office Action, the Examiner does not point to any portions of the above mentioned references as showing prestressing of a foam glass material, because none of them does.

As noted above, all of the pending claims in the present application as amended herein require a prestressed foam glass tile having a prestress compression of 4,000 psi or greater. To establish *prima facie* obviousness of a claimed invention under 35 U.S.C. § 103(a), all of the claim limitations must be taught or suggested by the prior art. MPEP 2143.03. However, as noted above, none of the prior art references relied upon by the

Examiner in connection with the prior art rejection discloses or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone the prestress compression of 4,000 psi or greater. Accordingly, it is respectfully submitted that the '037 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 1-5, 13, 14, 23-27, 29-31, 37 and 42-66 obvious.

In addition, independent Claims 1 and 23 and their dependent claims require a prestressed foam glass tile, whose compression strength prior to being in the prestressed condition is 10,000 psi or greater. The Examiner takes the position that the '365 Patent or the '184 Patent discloses or suggests this feature. Applicant respectfully disagrees and submits that none of the prior art references relied upon by the Examiner, including the '365 Patent and the '184 Patent, discloses or suggests a foam glass product having a compression strength of 10,000 psi or greater in a non-prestressed condition.

To support his prior art rejection, the Examiner points to col. 1, lines 19-22 and 35-43 of the '365 Patent. The cited portion only discloses the range of compressional strength between 5,000 and 8,000 psi, which is still less than the compression strength of 10,000 psi or greater required by independent Claims 1 and 23 of the present application: "Such a material should be readily available, easily formed in lengths up to 100 feet, be able to withstand a stress of 5,000-8,000 psi," ('365 Patent, col. 1, lines 36-38). Furthermore, the '365 Patent does not provide any disclosure (such as compression strength measurements) or cite to any supporting reference that would enable one of ordinary skill in the art to achieve a foam glass tile having a length of up to

100 feet and a compression strength of up to 8,000 psi. Such feat would be considered impossible even with today's foam glass technology, let alone in 1978, the issue date of the '365 Patent. Despite the dubiousness of such feat, if it would have been possible at all, the '365 Patent is silent on how to go about achieving it. It is respectfully submitted that one of ordinary skill in the art would not be able to reproduce a foam glass product having a compression strength of 8,000 psi, let alone 10,000 psi or greater, on the basis of the disclosure of the '365 Patent.²

Similarly, the Examiner's reliance on the '184 Patent is also misplaced. To support his prior art rejection, the Examiner points to col. 1, lines 10-28 and col. 3, lines 24-35 of the '184 Patent. While the cited portion discloses a slab of cellular, agglomerated material having a compression strength "in excess of 1200 pounds per square inch" ('184 Patent, col. 3, lines 26-28), and suggests that it be "sufficiently strong to be used for structural purposes" (id., col. 1, lines 27-28), nowhere in the '184 Patent is there any disclosure or reference citation based on which one of ordinary skill in the art would be enabled to produce a non-prestressed foam glass tile having a compression strength of 2,000 psi or 3,000 psi, let alone 10,000 psi or greater.

Accordingly, it is respectfully submitted that neither the '365 Patent nor the '184 Patent nor any of the other prior art references relied upon by the Examiner for his prior

² In addition, as previously discussed in our response to the prior Office Action, the '365 Patent seems to be suggestion production of foam glass in the form of hollow elongate cylinders so that it can be used as conduit such as sewer pipe, telephone pole, or power line (Col. 1, lines 14-25). Unlike in the case of foam glass tiles, prestressing of these foam glass hollow elongate cylinders to be used as conduit, telephone poles, etc. would not be desirable, nor is it technically feasible or economical. Accordingly, one of ordinary skill in the art would not be motivated to apply prestressing to a foam glass product described in the '365 Patent. This is one more reason why the '365 Patent is not applicable in this case.

art rejection teaches or suggests a foam glass tile having a compression strength of 10,000 psi or greater when not in a prestressed condition, as required by independent Claims 1 and 23 and their respective dependent claims. Based on the foregoing reason alone, the '037 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 1-5, 13, 14, 23-27, 29-31 and 37 obvious.

The Examiner also takes the position that "[a]pplying a pre-compressive force of from 1,000 to 5,000 psi to the resulting assembled foam glass units, thus affording as much recovery from the effects of a greater degree of overload, would have constituted a further obvious expedient to one having ordinary skill in the art at the time the invention was made." (March 3, 2006 Final Office Action at 5). Applicant respectfully disagrees. As explained further below, there exists no suggestion or motivation to combine the knowledge of one of ordinary skill in the art generally about prestressing with the teachings of the above-mentioned prior art references relied upon by the Examiner. Furthermore, even if those teachings are somehow combined, it still would not be obvious to one of ordinary skill in the art to apply a prestress compression of 4,000 psi or greater to a foam glass tile, as required by all of the pending claims in the present application as amended herein. Other than merely asserting, as quoted above, that prestressing of foam glass units at a prestress compression of up to 5,000 psi would have been obvious to one of ordinary skill in the art, the Examiner provides no actual evidence that such person having ordinary skill in the art would have been motivated to combine

the general knowledge about prestressing with the teachings of the cited prior art references to render the claimed prestressed foam glass tile obvious.

Obviousness analysis under 35 U.S.C. § 103(a) precludes a hindsight-based analysis using the invention as a roadmap to find its prior art components. *See Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. MPEP 2143. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP 2143.01 (emphasis added). Furthermore, fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness. *Id.* In addition, it is never appropriate to rely solely on common knowledge in the art without evidentiary support in the record as the principal evidence upon which a rejection was based. MPEP 2144.03.

It is well known to a person having ordinary skill in the art that by prestressing, the resulting compression strength of the prestressed product will decrease by the prestress amount while the resulting tension strength will increase by the same amount. As noted in the response to the previous Office Action, it is also well known to a person having ordinary skill in the art that the optimum amount of prestress level would make the tension strength comparable to the compression strength. In other words, optimum prestress level = $0.5 \times (\text{compression strength} - \text{tension strength under non-prestressed})$

condition); and the resulting compression/tension strength under optimum prestress level = $0.5 \times (\text{compression strength} + \text{tension strength under non-prestressed condition})$). For more detailed explanations, please refer to the previously submitted reference, Edward Nawy, "Prestressed Concrete: A Fundamental Approach," 8-13 (1989).

For foam glass tiles, such as those described in TABLE 1 of the specification of the present application, it can be easily shown that the optimum prestress level can be achieved at roughly 44% of the compression strength of the foam glass tile prior to being in the prestressed condition. For example, for a foam glass tile having a compression strength of 10,000 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 4,400 psi; for the one having a compressional strength of 12,500 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 5,500 psi, etc.

However, one of ordinary skill in the art considering the general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner would not be motivated to apply prestress compression strength of 4,000 or greater to a foam glass tile. As discussed above, none of the prior art references relied upon by the Examiner discloses or even suggests a foam glass product having a compression strength of 10,000 psi or greater in its non-prestressed condition. The greatest amount of compression strength disclosed by any of the prior art references relied upon the Examiner is 8,000 psi, which is casually mentioned by the '365 Patent without providing enabling disclosure as noted above. For a non-prestressed foam glass tile having the

same amount of compression strength (i.e., 8,000 psi), the corresponding optimum prestress compression (which is at about 44% of the compression strength of a foam glass tile prior to being in a prestressed condition as discussed above) would be 3,500 psi.

Accordingly, even assuming that the '365 Patent had provided enabling disclosure for one of ordinary skill in the art to achieve a foam glass tile having a compression strength of up to 8,000 psi prior to being in a prestressed condition, which it does not as explained above, such person would not apply a prestress compression of 4,000 psi or greater to this foam glass tile since that would deviate from the optimum prestress compression level as understood by him or her. Such person would instead apply a prestress compression of at most 3,500 psi or less, corresponding to what would be an optimum prestress compression based on the compression strength of the foam glass tile prior to being in the prestress condition.

Accordingly, there exists no motivation for one of ordinary skill in the art to combine his or her general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner to practice prestressing of a foam glass tile under prestress compression of 4,000 psi or greater as required by all of the pending claims as amended herein. Alternatively, even if one of ordinary skill in the art is somehow motivated to combine his or her general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner, such person would not apply a prestress compression of 4,000 psi or greater to a foam glass tile, as such combination would suggest him or her to use a prestress compression of only 3,500 psi

or less as explained above. In addition, as discussed above, none of the prior art references relied upon by the Examiner discloses or even suggests a foam glass tile having a compression strength of 10,000 psi or greater prior to being in a prestressed condition, as required by independent Claims 1 and 23 and their dependent claims. Hence, it is respectfully submitted that the Examiner failed to establish the *prima facie* case of obviousness.

Based on at least the foregoing reasons, it is respectfully submitted that the '037 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 1, 5, 13, 14, 23, 27, 29-31, 37, 42-47, 51-59, and 63-66 obvious. In addition, the Examiner's rejection of Claims 2-4, 24-26, 48-50, and 60-62 has been rendered moot by their cancellation without prejudice. Accordingly, Applicant respectfully requests that the Examiner's rejection of Claims 1-5, 13, 14, 23-27, 29-31, 37 and 42-66 over prior art be withdrawn and that Claims 1, 5, 13, 14, 23, 27, 29-31, 37, 42-47, 51-59, and 63-66 be allowed over the '037 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent.

In the Final Office Action, the Examiner also rejected Claims 1-5, 13, 14 and 42-53 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,430,397 to Ellis ("the '397 Patent") in view of either the '316 Patent or the '656 Patent when considering either the '365 Patent or the '184 Patent, and further considering any of the

'565 Patent, the '619 Patent, and the '937 Patent. Applicant respectfully traverses these prior art rejections for the same reasons discussed above, which are reiterated below.

Applicant respectfully submits that none of the above-mentioned references relied upon by the Examiner teaches or even suggests prestressing of a foam glass tile under the prestress compression of 4,000 psi or greater as required by all of the pending claims in the present application as amended by this Amendment. As the Examiner acknowledged in the Office Action, the '397 Patent "does not present the tile units 12 as made of a foamed glass." (March 3, 2006 Final Office Action at 6). To support the claim rejection, the Examiner combines the teachings of the '316 Patent or the '656 Patent with that of the '397 Patent and takes the position that the '316 and the '656 Patents "teach utilization of foamed glass tiles or blocks within a tensioned structural arrangement." (Id.). However, the applicant respectfully submits that neither the '316 Patent nor the '656 Patent teaches prestressing of a foamed glass material under any amount of prestress compression, let alone the prestress compression of 4,000 psi or greater.

To support his prior art rejection, the Examiner again points to Fig. 11 and col. 4, lines 5-9 of the '316 Patent. However, nowhere in the '316 Patent, including the portions cited by the Examiner, is there any teaching or even suggestion of prestressing of a foam glass tile under any amount of prestress compression. In fact, col. 3, lines 73-74 of the '316 Patent describes what is shown in Fig. 11 merely as a "locking means for use in connection with a U-shaped or tubular seam 19e, 119e, 21e and 121e." Nowhere in the '316 Patent is there a suggestion that Fig. 11 shows prestressing of a foam glass tile under any amount of prestress compression. Furthermore, while the '316 Patent

suggests panels made of foamed glass or the like ('316 Patent, col. 4, lines 7-8), it then further suggests that "a load sustaining layer [be] made of concrete" ('316 Patent, col. 4, line 14), thus teaching away from production of a load sustaining layer made of prestressed foam glass materials. Based on the foregoing, it is respectfully submitted that the '316 Patent does not teach or suggest prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater as required by the pending claims as amended herein, and in fact teaches away from prestressing of a foam glass tile.

In the '656 Patent, the Examiner again points to Figs. 1, 2 and 6, as well as col. 3, lines 30-60 and col. 4, lines 34-37 to support his position with respect to the prior art rejection. However, nowhere in the '656 Patent, including the portions the Examiner cited, is there any teaching or even suggestion of prestressing of a foam glass tile under any amount of prestress compression. The '656 Patent suggests, at best, the use of foam glass as the roof covering materials. ('656 Patent, col. 4, lines 32-44). The Examiner points to the inner bracing cables 33, 34, the cross tie cables 36, the lower running cable 45, etc. that form the suspended roof structure in Figs. 1 and 2 of the '656 Patent as showing "tension members," but nowhere in the '656 Patent is there any teaching or suggestion that those tension members contribute to prestressing of foam glass materials used as the roof covering materials. (See generally '656 Patent, col. 6, line 42 - col. 8, line 14). In fact, Fig. 6 and col. 9, lines 49-55 of the '656 Patent teach reinforcing of foam glass elements 65 by securing them to the glass-fibre mats 60, 61 by adhesive 66, thus providing an alternative means for reinforcing foam glass materials and teaching

away from prestressing as means for reinforcing foam glass materials. Based on the foregoing, it is respectfully submitted that the '656 Patent does not teach or suggest prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater as required by the pending claims as amended herein, and in fact teaches away from prestressing of a foam glass tile.

It is further respectfully submitted that neither the '365 Patent, nor the '184 Patent, nor the '565 Patent, nor the '619 Patent, nor the '937 Patent teaches or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater. In the March 3, 2006 Final Office Action, the Examiner does not point to any portions of the above mentioned references as showing prestressing of a foam glass material, because none of them does.

As noted above, all of the pending claims in the present application as amended herein require a prestressed foam glass tile having a prestress compression of 4,000 psi or greater. To establish *prima facie* obviousness of a claimed invention under 35 U.S.C. § 103(a), all of the claim limitations must be taught or suggested by the prior art. MPEP 2143.03. However, as noted above, none of the prior art references relied upon by the Examiner in connection with the prior art rejection discloses or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone the prestress compression of 4,000 psi or greater. Accordingly, it is respectfully submitted that the '397 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 1-5, 13, 14 and 42-53 obvious.

In addition, independent Claim 1 and its dependent claims require a prestressed foam glass tile, whose compression strength prior to being in the prestressed condition is 10,000 psi or greater. The Examiner takes the position that the '365 Patent or the '184 Patent discloses or suggests this feature. Applicant respectfully disagrees and submits that none of the prior art references relied upon by the Examiner, including the '365 Patent and the '184 Patent, discloses or suggests a foam glass product having a compression strength of 10,000 psi or greater in a non-prestressed condition.

To support his prior art rejection, the Examiner points to col. 1, lines 35-43 of the '365 Patent. The cited portion only discloses the range of compressional strength between 5,000 and 8,000 psi, which is still less than the compression strength of 10,000 psi or greater required by independent Claims 1 and 23 of the present application:

"Such a material should be readily available, easily formed in lengths up to 100 feet, be able to withstand a stress of 5,000-8,000 psi," ('365 Patent, col. 1, lines 36-38).

Furthermore, the '365 Patent does not provide any disclosure (such as compression strength measurements) or cite to any supporting reference that would enable one of ordinary skill in the art to achieve a foam glass tile having a length of up to 100 feet and a compression strength of up to 8,000 psi. Such feat would be considered impossible even with today's foam glass technology, let alone in 1978, the issue date of the '365 Patent. Despite the dubious claim of such feat, if it would have been possible at all, the '365 Patent is silent on how to go about achieving it. It is respectfully submitted that one of ordinary skill in the art would not be able to reproduce a foam glass product having a

compression strength of 8,000 psi, let alone 10,000 psi or greater, on the basis of the disclosure of the '365 Patent.³

Similarly, the Examiner's reliance on the '184 Patent is also misplaced. To support his prior art rejection, the Examiner again points to col. 3, lines 24-35 of the '184 Patent. While the cited portion discloses a slab of cellular, agglomerated material having a compression strength "in excess of 1200 pounds per square inch" ('184 Patent, col. 3, lines 26-28), and suggests that it be "sufficiently strong to be used for structural purposes" (id., col. 1, lines 27-28), nowhere in the '184 Patent is there any disclosure or reference citation based on which one of ordinary skill in the art would be enabled to produce a non-prestressed foam glass tile having a compression strength of 2,000 psi or 3,000 psi, let alone 10,000 psi or greater.

Accordingly, it is respectfully submitted that neither the '365 Patent nor the '184 Patent nor any of the other prior art references relied upon by the Examiner for his prior art rejection teaches or suggests a foam glass tile having a compression strength of 10,000 psi or greater when not in a prestressed condition, as required by independent Claim 1 and its dependent claims. Based on the foregoing reason alone, the '397 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the

³ In addition, as previously discussed in our response to the prior Office Action, the '365 Patent seems to be suggestion production of foam glass in the form of hollow elongate cylinders so that it can be used as conduit such as sewer pipe, telephone pole, or power line ('365 Patent, Col. 1, lines 14-25). Unlike in the case of foam glass tiles, prestressing of these foam glass hollow elongate cylinders to be used as conduit, telephone poles, etc. would not be desirable, nor is it technically feasible or economical. Accordingly, one of ordinary skill in the art would not be motivated to apply prestressing to a foam glass product described in the '365 Patent. This is one more reason why the '365 Patent is not applicable in this case.

'619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 1-5, 13 and 14 obvious.

The Examiner also takes the position that "[a]pplying a pre-compressive force of from 1,000 to 5,000 psi to the resulting assembled foam glass units, thus affording as much recovery from the effects of a greater degree of overload, would have constituted a further obvious expedient to one having ordinary skill in the art at the time the invention was made." (March 3, 2006 Final Office Action at 7). Applicant respectfully disagrees. As explained here again, there exists no suggestion or motivation to combine the knowledge of one of ordinary skill in the art generally about prestressing with the teachings of the above-mentioned prior art references relied upon by the Examiner. Furthermore, even if those teachings are somehow combined, it still would not be obvious to one of ordinary skill in the art to apply a prestress compression of 4,000 psi or greater to a foam glass tile, as required by all of the pending claims in the present application as amended herein. Other than merely asserting, as quoted above, that prestressing of foam glass units at a prestress compression of up to 5,000 psi would have been obvious to one of ordinary skill in the art, the Examiner provides no actual evidence that such person would have been motivated to combine the general knowledge about prestressing with the teachings of the cited prior art references to render the claimed prestressed foam glass tile obvious.

Obviousness analysis under 35 U.S.C. § 103(a) precludes a hindsight-based analysis using the invention as a roadmap to find its prior art components. *See Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). To establish a *prima facie* case of

obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. MPEP 2143. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP 2143.01 (emphasis added). Furthermore, fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish prima facie obviousness. *Id.* In addition, it is never appropriate to rely solely on common knowledge in the art without evidentiary support in the record as the principal evidence upon which a rejection was based. MPEP 2144.03.

It is well known to a person having ordinary skill in the art that by prestressing, the resulting compression strength of the prestressed product will decrease by the prestress amount while the resulting tension strength will increase by the same amount. As noted in the response to the previous Office Action, it is also well known to a person having ordinary skill in the art that the optimum amount of prestress level would make the tension strength comparable to the compression strength. In other words, optimum prestress level = $0.5 \times (\text{compression strength} - \text{tension strength under non-prestressed condition})$; and the resulting compression/tension strength under optimum prestress level = $0.5 \times (\text{compression strength} + \text{tension strength under non-prestressed condition})$). For more detailed explanations, please refer to the previously submitted reference, Edward Nawy, "Prestressed Concrete: A Fundamental Approach," 8-13 (1989).

For foam glass tiles, such as those described in TABLE 1 of the specification of the present application, it can be easily shown that the optimum prestress level can be achieved at roughly 44% of the compression strength of the foam glass tile prior to being in the prestressed condition. For example, for a foam glass tile having a compression strength of 10,000 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 4,400 psi; for the one having a compressional strength of 12,500 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 5,500 psi, etc.

However, one of ordinary skill in the art considering the general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner would not be motivated to apply prestress compression strength of 4,000 or greater to a foam glass tile. As discussed above, none of the prior art references relied upon by the Examiner discloses or even suggests a foam glass product having a compression strength of 10,000 psi or greater in its non-prestressed condition. The greatest amount of compression strength disclosed by any of the prior art references relied upon the Examiner is 8,000 psi, which is casually mentioned by the '365 Patent without providing enabling disclosure as noted above. For a non-prestressed foam glass tile having the same amount of compression strength (i.e., 8,000 psi), the corresponding optimum prestress compression (which is at about 44% of the compression strength of a foam glass tile prior to being in a prestressed condition as discussed above) would be 3,500 psi.

Accordingly, even assuming that the '365 Patent had provided enabling disclosure for one of ordinary skill in the art to achieve a foam glass tile having a compression strength of up to 8,000 psi prior to being in a prestressed condition, which it does not as explained above, such person would not apply a prestress compression of 4,000 psi or greater to this foam glass tile since that would deviate from the optimum prestress compression level as understood by him or her. Such person would instead apply a prestress compression of at most 3,500 psi or less, corresponding to what would be an optimum prestress compression based on the compression strength of the foam glass tile prior to being in the prestress condition.

Accordingly, there exists no motivation for one of ordinary skill in the art to combine his or her general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner to practice prestressing of a foam glass tile under prestress compression of 4,000 psi or greater as required by all of the pending claims as amended herein. Alternatively, even if one of ordinary skill in the art is somehow motivated to combine his or her general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner, such person would not apply a prestress compression of 4,000 psi or greater to a foam glass tile, as such combination would suggest him or her to use a prestress compression of only 3,500 psi or less as explained above. In addition, as discussed above, none of the prior art references relied upon by the Examiner discloses or even suggests a foam glass tile having a compression strength of 10,000 psi or greater prior to being in a prestressed condition, as required by independent Claim 1 and its dependent claims. Hence, it is

respectfully submitted that the Examiner failed to establish the *prima facie* case of obviousness.

Based on at least the foregoing reasons, it is respectfully submitted that the '397 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 1-5, 13, 14 and 42-53 obvious. In addition, the Examiner's rejection of Claims 2-4 and 48-50 has been rendered moot by cancellation of those Claims without prejudice. Accordingly, Applicant respectfully requests that the Examiner's rejection of Claims 1-5, 13, 14 and 42-53 over prior art be withdrawn and that Claims 1, 5, 13, 14, 42-47 and 51-53 be allowed over the '397 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent.

Lastly, the Examiner rejected Claims 23-27, 29-31, 37 and 54-66 under 35 U.S.C. § 103(a) as being unpatentable over the '397 Patent in view of either the '316 Patent or the '656 Patent when considering either the '365 Patent or the '184 Patent and further considering any of the '565 Patent, the '619 Patent, and the '937 Patent as applied to Claims 1-5, 13, 14 and 42-53, and further in view of the '037 Patent. Applicant respectfully traverses these prior art rejections for the same reasons discussed above, which are reiterated as follows.

Applicant respectfully submits that none of the above-mentioned references relied upon by the Examiner teaches or even suggests prestressing of a foam glass tile under

the prestress compression of 4,000 psi or greater as required by all of the pending claims in the present application as amended by this Amendment. As the Examiner acknowledged earlier, neither the '037 Patent nor the '397 Patent discloses a foam glass tile (See March 3, 2006 Final Office Action at 3, 6). To support the claim rejection, the Examiner combines the teachings of the '316 Patent or the '656 Patent with that of the '037 Patent and the '397 Patent. However, the applicant respectfully submits that neither the '316 Patent nor the '656 Patent teaches prestressing of a foamed glass material under any amount of prestress compression, let alone the prestress compression of 4,000 psi or greater.

Nowhere in the '316 Patent is there any teaching or even suggestion of prestressing of a foam glass tile under any amount of prestress compression. In fact, col. 3, lines 73-74 of the '316 Patent describes what is shown in Fig. 11 merely as a "locking means for use in connection with a U-shaped or tubular seam 19e, 119e, 21e and 121e." Nowhere in the '316 Patent is there a suggestion that Fig. 11 shows prestressing of a foam glass tile under any amount of prestress compression. Furthermore, while the '316 Patent suggests panels made of foamed glass or the like ('316 Patent, col. 4, lines 7-8), it then further suggests that "a load sustaining layer [be] made of concrete" ('316 Patent, col. 4, line 14), thus teaching away from production of a load sustaining layer made of prestressed foam glass materials. Based on the foregoing, it is respectfully submitted that the '316 Patent does not teach or suggest prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or

greater as required by the pending claims as amended herein, and in fact teaches away from prestressing of a foam glass tile.

The Examiner's reliance on the '656 Patent is similarly misplaced. Nowhere in the '656 Patent is there any teaching or even suggestion of prestressing of a foam glass tile under any amount of prestress compression. The '656 Patent suggests, at best, the use of foam glass as the roof covering materials. ('656 Patent, col. 4, lines 32-44). The inner bracing cables 33, 34, the cross tie cables 36, the lower running cable 45, etc., which the Examiner pointed to earlier, form the suspended roof structure in Figs. 1 and 2 of the '656 Patent, but nowhere in the '656 Patent is there any teaching or suggestion that those tension members contribute to prestressing of foam glass materials used as the roof covering materials. (See generally col. 6, line 42 - col. 8, line 14). In fact, Fig. 6 and col. 9, lines 49-55 of the '656 Patent teach reinforcing of foam glass elements 65 by securing them to the glass-fibre mats 60, 61 by adhesive 66, thus providing an alternative means for reinforcing foam glass materials and teaching away from prestressing as means for reinforcing foam glass materials. Based on the foregoing, it is respectfully submitted that the '656 Patent does not teach or suggest prestressing of a foam glass tile under any amount of prestress compression, let alone under prestress compression of 4,000 psi or greater as required by the pending claims as amended herein, and in fact teaches away from prestressing of a foam glass tile.

It is further respectfully submitted that neither the '365 Patent, nor the '184 Patent, nor the '565 Patent, nor the '619 Patent, nor the '937 Patent teaches or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone

under prestress compression of 4,000 psi or greater. The Examiner does not point to any portions of the above mentioned references as showing prestressing of a foam glass material, because none of them does.

As noted above, all of the pending claims in the present application as amended herein require a prestressed foam glass tile having a prestress compression of 4,000 psi or greater. To establish *prima facie* obviousness of a claimed invention under 35 U.S.C. § 103(a), all of the claim limitations must be taught or suggested by the prior art. MPEP 2143.03. However, as noted above, none of the prior art references relied upon by the Examiner in connection with the prior art rejection discloses or suggests prestressing of a foam glass tile under any amount of prestress compression, let alone the prestress compression of 4,000 psi or greater. Accordingly, it is respectfully submitted that the '397 Patent, the '037 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 23-27, 29-31, 37 and 54-66 obvious.

In addition, independent Claim 23 and its dependent claims require a prestressed foam glass tile, whose compression strength prior to being in the prestressed condition is 10,000 psi or greater. However, none of the prior art references relied upon by the Examiner, including the '365 Patent and the '184 Patent pointed out by the Examiner earlier as containing this feature, discloses or suggests a foam glass product having a compression strength of 10,000 psi or greater in a non-prestressed condition.

The '365 Patent only discloses the range of compressional strength between 5,000 and 8,000 psi, which is still less than the compression strength of 10,000 psi or greater

required by independent Claim 23 of the present application: "Such a material should be readily available, easily formed in lengths up to 100 feet, be able to withstand a stress of 5,000-8,000 psi," ('365 Patent, col. 1, lines 36-38). Furthermore, the '365 Patent does not provide any disclosure (such as compression strength measurements) or cite to any supporting reference that would enable one of ordinary skill in the art to achieve a foam glass tile having a length of up to 100 feet and a compression strength of up to 8,000 psi. Such feat would be considered impossible even with today's foam glass technology, let alone in 1978, the issue date of the '365 Patent. Despite the dubious claim of such feat, if it would have been possible at all, the '365 Patent is silent on how to go about achieving it. It is respectfully submitted that one of ordinary skill in the art would not be able to reproduce a foam glass product having a compression strength of 8,000 psi, let alone 10,000 psi or greater, on the basis of the disclosure of the '365 Patent.⁴

Similarly, the Examiner's reliance on the '184 Patent is also misplaced. While the '184 Patent discloses a slab of cellular, agglomerated material having a compression strength "in excess of 1200 pounds per square inch" ('184 Patent, col. 3, lines 26-28), and suggests that it be "sufficiently strong to be used for structural purposes" (id., col. 1, lines 27-28), nowhere in the '184 Patent is there any disclosure or reference citation

⁴ In addition, as previously discussed in our response to the prior Office Action, the '365 Patent seems to be suggestion production of foam glass in the form of hollow elongate cylinders so that it can be used as conduit such as sewer pipe, telephone pole, or power line (Col. 1, lines 14-25). Unlike in the case of foam glass tiles, prestressing of these foam glass hollow elongate cylinders to be used as conduit, telephone poles, etc. would not be desirable, nor is it technically feasible or economical. Accordingly, one of ordinary skill in the art would not be motivated to apply prestressing to a foam glass product described in the '365 Patent. This is one more reason why the '365 Patent is not applicable in this case.

based on which one of ordinary skill in the art would be enabled to produce a non-prestressed foam glass tile having a compression strength of 2,000 psi or 3,000 psi, let alone 10,000 psi or greater.

Accordingly, it is respectfully submitted that neither the '365 Patent nor the '184 Patent nor any of the other prior art references relied upon by the Examiner for his prior art rejection teaches or suggests a foam glass tile having a compression strength of 10,000 psi or greater when not in a prestressed condition, as required by independent Claims 1 and 23 and their respective dependent claims. Based on the foregoing reason alone, the '397 Patent, the '037 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, and the '937 Patent, either separately or in any combination, do not render any of Claims 23-27, 29-31 and 37 obvious.

Furthermore, it is respectfully submitted that there exists no suggestion or motivation to combine the knowledge of one of ordinary skill in the art generally about prestressing with the teachings of the above-mentioned prior art references relied upon by the Examiner. Even if those teachings are somehow combined, it still would not be obvious to one of ordinary skill in the art to apply a prestress compression of 4,000 psi or greater to a foam glass tile, as required by all of the pending claims in the present application as amended herein. The Examiner provides no actual evidence that such person having ordinary skill in the art would have been motivated to combine the general knowledge about prestressing with the teachings of the cited prior art references to render the claimed prestressed foam glass tile obvious.

Obviousness analysis under 35 U.S.C. § 103(a) precludes a hindsight-based analysis using the invention as a roadmap to find its prior art components. *See Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. MPEP 2143. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP 2143.01 (emphasis added). Furthermore, fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness. *Id.* In addition, it is never appropriate to rely solely on common knowledge in the art without evidentiary support in the record as the principal evidence upon which a rejection was based. MPEP 2144.03.

It is well known to a person having ordinary skill in the art that by prestressing, the resulting compression strength of the prestressed product will decrease by the prestress amount while the resulting tension strength will increase by the same amount. As noted in the response to the previous Office Action, it is also well known to a person having ordinary skill in the art that the optimum amount of prestress level would make the tension strength comparable to the compression strength. In other words, optimum prestress level = $0.5 \times (\text{compression strength} - \text{tension strength under non-prestressed condition})$; and the resulting compression/tension strength under optimum prestress level = $0.5 \times (\text{compression strength} + \text{tension strength under non-prestressed condition})$.

condition)). For more detailed explanations, please refer to the previously submitted reference, Edward Nawy, "Prestressed Concrete: A Fundamental Approach," 8-13 (1989).

For foam glass tiles, such as those described in TABLE 1 of the specification of the present application, it can be easily shown that the optimum prestress level can be achieved at roughly 44% of the compression strength of the foam glass tile prior to being in the prestressed condition. For example, for a foam glass tile having a compression strength of 10,000 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 4,400 psi; for the one having a compressional strength of 12,500 psi prior to being in a prestressed condition, the corresponding optimum prestress compression is approximately 5,500 psi, etc.

However, one of ordinary skill in the art considering the general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner would not be motivated to apply prestress compression strength of 4,000 or greater to a foam glass tile. As discussed above, none of the prior art references relied upon by the Examiner discloses or even suggests a foam glass product having a compression strength of 10,000 psi or greater in its non-prestressed condition. The greatest amount of compression strength disclosed by any of the prior art references relied upon the Examiner is 8,000 psi, which is casually mentioned by the '365 Patent without providing enabling disclosure as noted above. For a non-prestressed foam glass tile having the same amount of compression strength (i.e., 8,000 psi), the corresponding optimum prestress compression (which is at about 44% of the compression strength of a foam

glass tile prior to being in a prestressed condition as discussed above) would be 3,500 psi.

Accordingly, even assuming that the '365 Patent had provided enabling disclosure for one of ordinary skill in the art to achieve a foam glass tile having a compression strength of up to 8,000 psi prior to being in a prestressed condition, which it does not, such person would not apply a prestress compression of 4,000 psi or greater to this foam glass tile since that would deviate from the optimum prestress compression level as understood by him or her. Such person would instead apply a prestress compression of at most 3,500 psi or less, corresponding to what would be an optimum prestress compression based on the compression strength of the foam glass tile prior to being in the prestress condition.

Accordingly, there exists no motivation for one of ordinary skill in the art to combine his or her general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner to practice prestressing of a foam glass tile under prestress compression of 4,000 psi or greater as required by all of the pending claims as amended herein. Alternatively, even if one of ordinary skill in the art is somehow motivated to combine his or her general knowledge about prestressing and the teachings of the prior art references relied upon by the Examiner, such person would not apply a prestress compression of 4,000 psi or greater to a foam glass tile, as such combination would suggest him or her to use a prestress compression of only 3,500 psi or less as explained above. In addition, as discussed above, none of the prior art references relied upon by the Examiner discloses or even suggests a foam glass tile

having a compression strength of 10,000 psi or greater prior to being in a prestressed condition, as required by independent Claims 1 and 23 and their dependent claims.

Hence, it is respectfully submitted that the Examiner failed to establish the *prima facie* case of obviousness.

Based on at least the foregoing reasons, it is respectfully submitted that the '397 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, the '937 Patent and the '037 Patent, either separately or in any combination, do not render any of Claims 23-27, 29-31, 37 and 54-66 obvious. In addition, the Examiner's rejection of Claims 24-26 and 60-62 has been rendered moot by cancellation of those Claims without prejudice. Accordingly, Applicant respectfully requests that the Examiner's rejection of Claims 23-27, 29-31, 37 and 54-66 over prior art be withdrawn and that Claims 23, 27, 29-31, 37, 54-59, and 63-66 be allowed over the '397 Patent, the '316 Patent, the '656 Patent, the '365 Patent, the '184 Patent, the '565 Patent, the '619 Patent, the '937 Patent and the '037 Patent.

* * *

In view of the foregoing amendments and remarks, Applicant respectfully requests that a timely Notice of Allowance with respect to all of the pending claims be issued in this case.

Included herewith are (1) a Request for Continued Examination, (2) a Petition for a One Month Extension of Time, (3) a Second Supplemental Information Disclosure Statement and (4) a check in the amount of \$455.00 to cover the fee (\$395.00) for filing the Request for Continued Examination and the fee (\$60.00) for a one-month extension

of time for response for a small entity. No additional fees or extensions of time are believed to be due in connection with filing of this Amendment After Final and the Request for Continued Examination. However, authorization is given hereby to charge Deposit Account No. 01-1785 for any deficiency in fees necessary to preserve the pendency of the subject application, or to credit the same in case of overpayment.

Should the Examiner believe that a telephone discussion would be helpful to expedite prosecution, he is invited to call the undersigned attorney at any convenient time.

Respectfully submitted,

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Dated: New York, New York
June 26, 2006

By: 

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